In the Claims:

WHAT IS CLAIMED IS:

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17. (original) In a touch-screen display system for generating pixel coordinate estimates responsive to a user touching a display screen, an apparatus for generating and validating said pixel coordinate estimates comprising:

a processor to determine a first valid pixel coordinate estimate for a first touch-screen axis of said touch-screen display system before determining a second valid pixel coordinate estimate for a second touch-screen axis of said touch-screen display system.

18. (original) The apparatus of claim 17 wherein said processor is adapted to power on said first touch-screen axis of said touch-screen display system and to power off said second touch-screen axis of said touch-screen display system.

19. (original) The apparatus of claim 18 wherein said first touch-screen axis is an x-axis and said second touch-screen axis is a y-axis.

20. (original) The apparatus of claim 18 wherein said processor is adapted to generate a first pixel coordinate estimate corresponding to said first touch-screen axis and a second pixel coordinate estimate corresponding to said first touch-screen axis such that said first pixel coordinate estimate and said second pixel coordinate estimate are separated in time by a pre-determined sampling interval.

21. (original) The apparatus of claim 20 wherein said processor is responsive to said first pixel coordinate estimate of said first touch-screen axis and said second pixel coordinate estimate of said first touch-screen axis to generate a first comparison parameter value.

22. (original) The apparatus of claim 21 wherein said processor is adapted to read a pre-determined first threshold value.

23. (original) The apparatus of claim 22 wherein said processor is adapted to compare said first comparison parameter value to said pre-determined first threshold value.

24. (original) The apparatus of claim 23 wherein said processor is adapted to select said second pixel coordinate estimate of said first touch-screen axis as a first valid pixel coordinate estimate of said first touch-screen axis if said first comparison parameter value is in a first definite relationship to said pre-determined first threshold value.

25. (original) The apparatus of claim 23 wherein said processor is adapted to define said first valid pixel coordinate estimate as invalid if said first comparison parameter value is in a second definite relationship to said pre-determined first threshold value.

26. (original) The apparatus of claim 25 wherein said processor is adapted to make, at most, a pre-determined number of attempts to generate and select said first valid pixel coordinate estimate.

27. (original) The apparatus of claim 25 wherein said processor is adapted to define a "no touch" state as being detected and to generate a "no touch" parameter value to indicate said "no touch" state as being detected when said first valid pixel coordinate estimate is defined as invalid.

28. (original) The apparatus of claim 26 wherein said processor is adapted to define said "no touch" state as being detected by generating a "no touch" parameter value to indicate said "no touch" state as being detected if said pre-determined number of attempts is reached and said processor still defines said first valid pixel coordinate estimate as invalid.

29. (original) The apparatus of claim 17 wherein said processor is adapted to power on said second touch-screen axis of said touch-screen display system and to power off said first touch-screen axis of said touch-screen display system.

30. (original) The apparatus of claim 29 wherein said processor is adapted to generate a first pixel coordinate estimate corresponding to said second touch-screen axis and a second pixel coordinate estimate corresponding to said second touch-screen axis such that said first pixel coordinate estimate and said second pixel coordinate estimate are separated in time by a pre-determined sampling interval.

31. (original) The apparatus of claim 30 wherein said processor is responsive to said first pixel coordinate estimate of said second touch-screen axis and said second pixel coordinate estimate of said second touch-screen axis to generate a second comparison parameter value.

32. (original) The apparatus of claim 31 wherein said processor is adapted to read a pre-determined second threshold value.

33. (original) The apparatus of claim 32 wherein said processor is adapted to compare said second comparison parameter value to said pre-determined second threshold value.

34. (original) The apparatus of claim 33 wherein said processor is adapted to select said second pixel coordinate estimate of said second touch-screen axis as a second valid pixel coordinate estimate of said second touch-screen axis if said second comparison parameter value is in a first definite relationship to said pre-determined second threshold value.

35. (original) The apparatus of claim 33 wherein said processor is adapted to define said second valid pixel coordinate estimate as invalid if said second comparison parameter value is in a second definite relationship to said pre-determined second threshold value.

36. (original) The apparatus of claim 35 wherein said processor is adapted to generate and select said first valid pixel coordinate estimate corresponding to said first touch-screen axis before making another attempt to generate and select said second valid pixel coordinate estimate corresponding to said second touch-screen axis.

37. (original) The apparatus of claim 36 wherein said processor is adapted to make, at most, a pre-determined number of attempts to generate and select said second valid pixel coordinate estimate.

38. (original) The apparatus of claim 35 wherein said processor is adapted to define a "no touch" state as being detected and to generate a "no touch" parameter value to indicate said "no touch" state as being detected when said second valid pixel coordinate estimate is defined as invalid.

39. (original) The apparatus of claim 37 wherein said processor is adapted to define said "no touch" state as being detected by generating a "no touch" parameter value to indicate said "no touch" state as being detected if said pre-determined number of attempts is reached and said processor still defines said second valid pixel coordinate estimate as invalid.

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70. (original) In a touch-screen display system for generating pixel coordinate estimates responsive to a user touching a display screen, a method for generating and validating said pixel coordinate estimates comprising:

generating and determining the validity of a first valid pixel coordinate estimate for a first touch-screen axis of said touch-screen display system before generating and determining the validity of a second valid pixel coordinate estimate for a second touch-screen axis of said touch-screen display system.

71. (original) The method of claim 70 further comprising powering on said first touch-screen axis of said touch-screen display system and powering off said second touch-screen axis of said touch-screen display system.

72. (original) The method of claim 71 wherein said first touch-screen axis is an x-axis and said second touch-screen axis is a y-axis.

73. (original) The method of claim 71 further comprising generating a first pixel coordinate estimate corresponding to said first touch-screen axis and a second pixel coordinate estimate corresponding to said first touch-screen axis such that said first pixel coordinate estimate and said second pixel coordinate estimate are separated in time by a pre-determined sampling interval.

74. (original) The method of claim 73 further comprising generating a first comparison parameter value from said first pixel coordinate estimate of said first touch-screen axis and said second pixel coordinate estimate of said first touch-screen axis.

75. (original) The method of claim 74 further comprising comparing said first comparison parameter value to a pre-determined first threshold value.

76. (original) The method of claim 75 further comprising selecting said second pixel coordinate estimate of said first touch-screen axis as a first valid pixel coordinate estimate of said first touch-screen axis if said first comparison parameter value is in a first definite relationship to said pre-determined first threshold value.

77. (original) The method of claim 75 further comprising defining said first valid pixel coordinate estimate as invalid if said first comparison parameter value is in a second definite relationship to said pre-determined first threshold value.

78. (original) The method of claim 77 further comprising making, at most, a pre-determined number of attempts to generate and select said first valid pixel coordinate estimate.

79. (original) The method of claim 77 further comprising defining a "no touch" state as being detected and generating a "no touch" parameter value to indicate said "no touch" state as being detected when said first valid pixel coordinate estimate is defined as invalid.

80. (original) The method of claim 78 further comprising a "no touch" state as being detected by generating a "no touch" parameter value to indicate said "no touch" state as being detected if said pre-determined number of attempts is reached and said first valid pixel coordinate estimate is still defined as invalid.

81. (original) The apparatus of claim 70 further powering on said second touch-screen axis of said touch-screen display system and powering off said first touch-screen axis of said touch-screen display system.

82. (original) The method of claim 81 further generating a first pixel coordinate estimate corresponding to said second touch-screen axis and a second pixel coordinate estimate corresponding to said second touch-screen axis such that said first pixel coordinate estimate and said second pixel coordinate estimate are separated in time by a pre-determined sampling interval.

83. (original) The method of claim 82 further comprising generating a second comparison parameter value from said first pixel coordinate estimate of said second touch-screen axis and said second pixel coordinate estimate of said second touch-screen axis.

84. (original) The method of claim 83 further comprising comparing said second comparison parameter value to a pre-determined second threshold value.

85. (original)The method of claim 84 further comprising selecting said second pixel coordinate estimate of said second touch-screen axis as a second valid pixel coordinate estimate of said second touch-screen axis if said second comparison parameter value is in a first definite relationship to said pre-determined second threshold value.

86. (original) The method of claim 84 further comprising defining said second valid pixel coordinate estimate as invalid if said second comparison parameter value is in a second definite relationship to said pre-determined second threshold value.

87. (original) The method of claim 86 further comprising generating and selecting said first valid pixel coordinate estimate corresponding to said first touch-screen axis before again attempting to generate and select said second valid pixel coordinate estimate corresponding to said second touch-screen axis.

88. (original) The method of claim 87 further comprising making, at most, a pre-determined number of attempts to generate and select said second valid pixel coordinate estimate.

89. (original) The method of claim 86 further comprising defining a "no touch" state as being detected and generating a "no touch" parameter value to indicate said "no touch" state as being detected when said second valid pixel coordinate estimate is defined as invalid.

90. (original) The method of claim 88 further comprising said "no touch" state as being detected by generating a "no touch" parameter value to indicate said "no touch" state as being detected if said pre-determined number of attempts is reached and said second valid pixel coordinate estimate is still defined as invalid.

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102. (original) A method of determining a touch screen coordinate for a touch screen comprising the steps of:

turning on the driver of the coordinate to be measured;

measuring minimum, maximum, and raw position data for the coordinate being measured; and

determining the coordinate position as a function of the raw position in relation to a coordinate range.

103. (original) The method of claim 102 wherein the range is determined as a function of the difference between the minimum and maximum position data.

104. (original) The method of claim 103 wherein the positioning determining step includes subtracting the minimum position data from the raw position data.

105. (original) The method of claim 104 wherein the raw, minimum and maximum position data are used to calibrate the touch screen without requiring specific calibration using input.

106. (original) The method of claim 104 including the further step of turning off the driver of a coordinate not being measured.

107. (original) The method of claim 104 wherein the foregoing steps are repeated for the other driver whose coordinate is to be determined.

108. (original) An apparatus determining a touch screen coordinate for a touch screen comprising:

means for turning on the driver of the coordinate to be measured;

means for measuring minimum, maximum, and raw position data for the coordinate being measured; and

means for determining the coordinate position as a function of the raw position in relation to a coordinate range.

109. (original) The apparatus of claim 108 wherein the coordinate range is determined as a function of the difference between the minimum and maximum position data.

110. (original) The apparatus of claim 109 wherein the positioning determining means includes means for subtracting the minimum position data from the raw position data.

111. (original) The apparatus of claim 110 wherein the raw, minimum and maximum position data are used to calibrate the touch screen without requiring specific calibration using input.

112. (original) The apparatus of claim 110 further including means for turning off the driver of a coordinate not being measured.

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